Overview of Laboratory Studies Related to NOx/NOy Chemistry in the UT/LS

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Key Lab Questions on UT/LS NOx/NOy

- Are reaction rates known well enough for the important ozone related reactions involving NOx/NOy?
- Are we overlooking significant gas phase photochemical processes?
- Can atmospheric aerosols act to deactivate NOx and remove NOy?
- Can atmospheric aerosols catalyze reactivation of NOx from NOy?

Lab Progress - 1

- Reducing uncertainty on known photochemical processes
  - HNO_4 and PAN quantum yields
  - Reevaluation of $OH + NO_2$
- New gas-phase processes
  - HNO_4 overtone spectroscopy and photodissociation

Lab Progress - 2

- Aerosol Uptake
  - HNO_4 and PAN accomodation coefficients in sulfuric acid
  - HNO_3 and HNO_4 uptake on ice
- Heterogeneous Reactions
  - Conversion of HNO_3 to NO_x on soot

Future Lab Directions

- Further investigation of cirrus-scavenging: HNO_3 and HNO_4 uptakes at lower partial pressures and/or warmer temperatures
- Identify additional heterogeneous and/or solution phase processes that involve the increased NO_x from aircraft. Especially consider those that could impact surface reactivity and cloud condensation nucleating capabiliy